Aquarius v.3.0 Release 5 New Features

To view a video demonstration of what is written here, click the hyperlink in the box below.

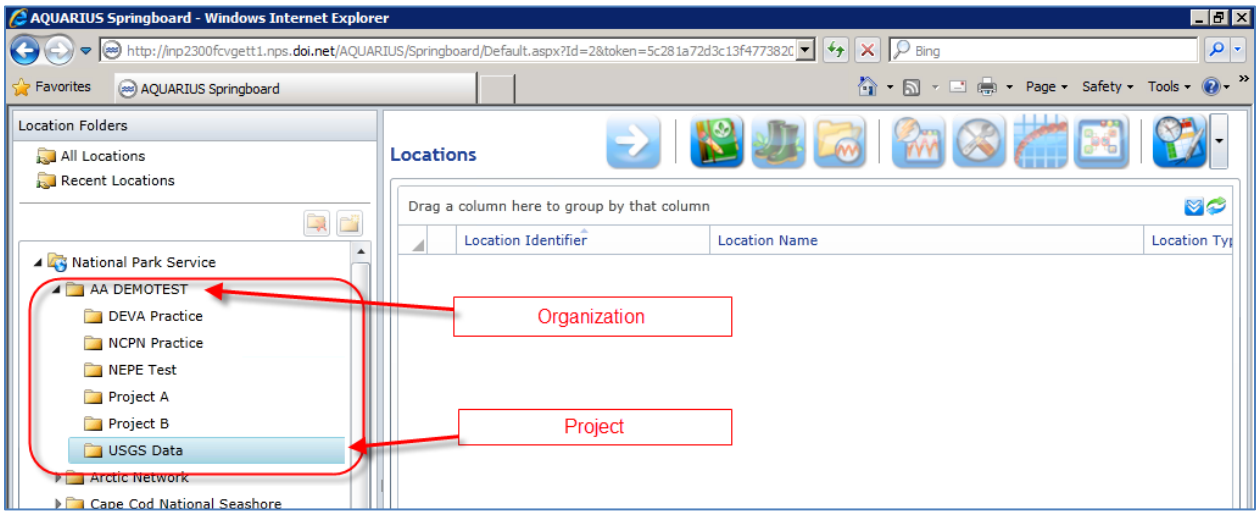
http://nrdata.nps.gov/Programs/Water/Aquarius/Videos/Five_New_Features_in_Release_5/Five_New_Features_in_Release_5.html

This document provides a quick overview of the following new features/enhancements that were introduced in Aquarius v.3.0 Release 5:

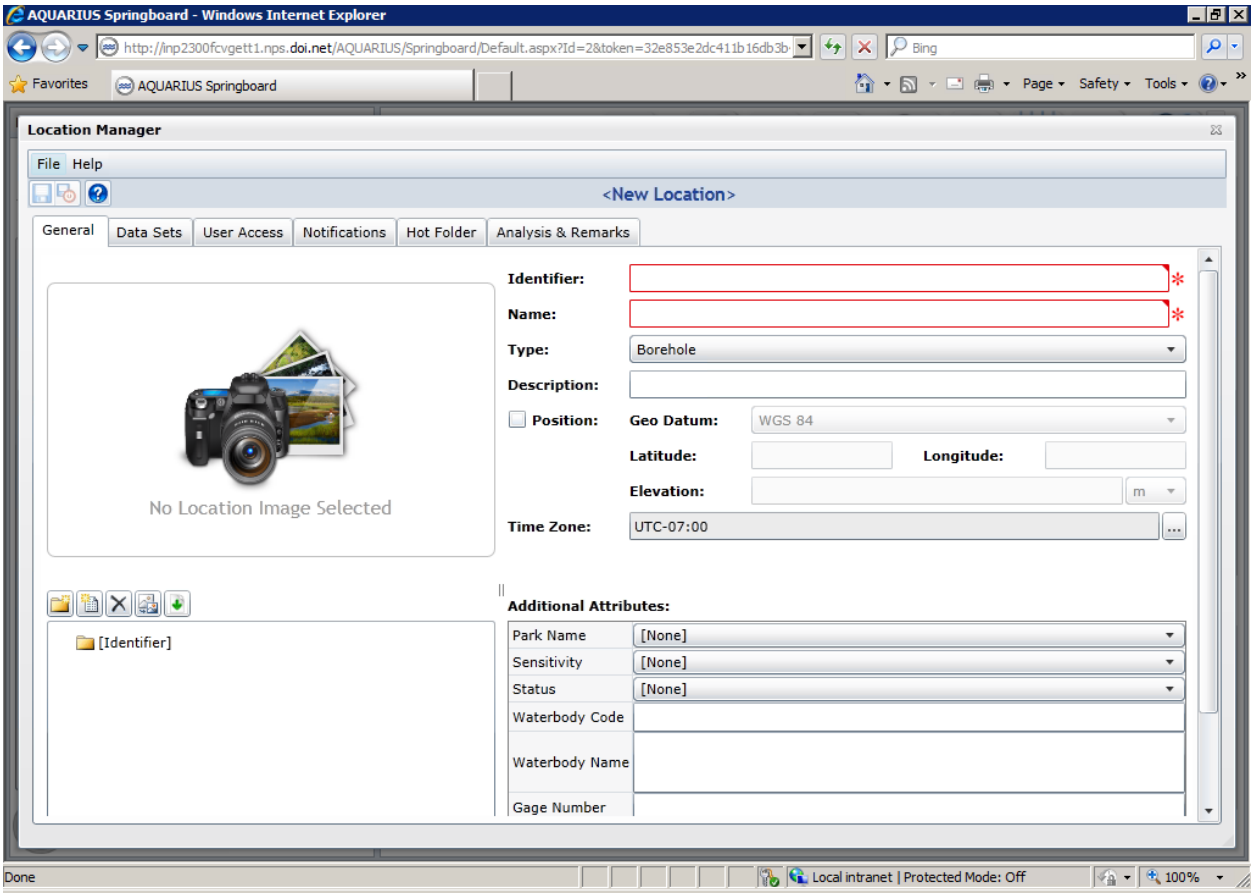
1. OGC/web client access to external data sources (how to use USGS data)
2. Summary Data Graphed in Quick View
3. Launch Aquarius Whiteboard from Within Springboard
4. Statistically-Derived Time Series
5. Reporting Enhancements

Note: The complete list of new features introduced in Release 5, including the ability to create time series dataset containers directly from the Append Logger File tool that was demonstrated in the Springboard Introduction, are documented in the Aquarius 3.0 R5 Release Notes.

This overview of new features assumes you are either familiar with Aquarius and/or have read the Springboard and Whiteboard overview documents or watched the video demonstrations. This overview uses Aquarius Springboard since most of the new features are in the Aquarius Server application which includes the Springboard interface. To begin, we'll need an organization and a project under which to store our location and data. You can use your existing organization and an existing project as desired. For this overview, however, we'll use the 'AA DEMOTEST' organization. Click on 'AA DEMOTEST' and then right-click on it and choose 'New Project'. Rename the 'New Project' to be 'USGS Data' as shown below.



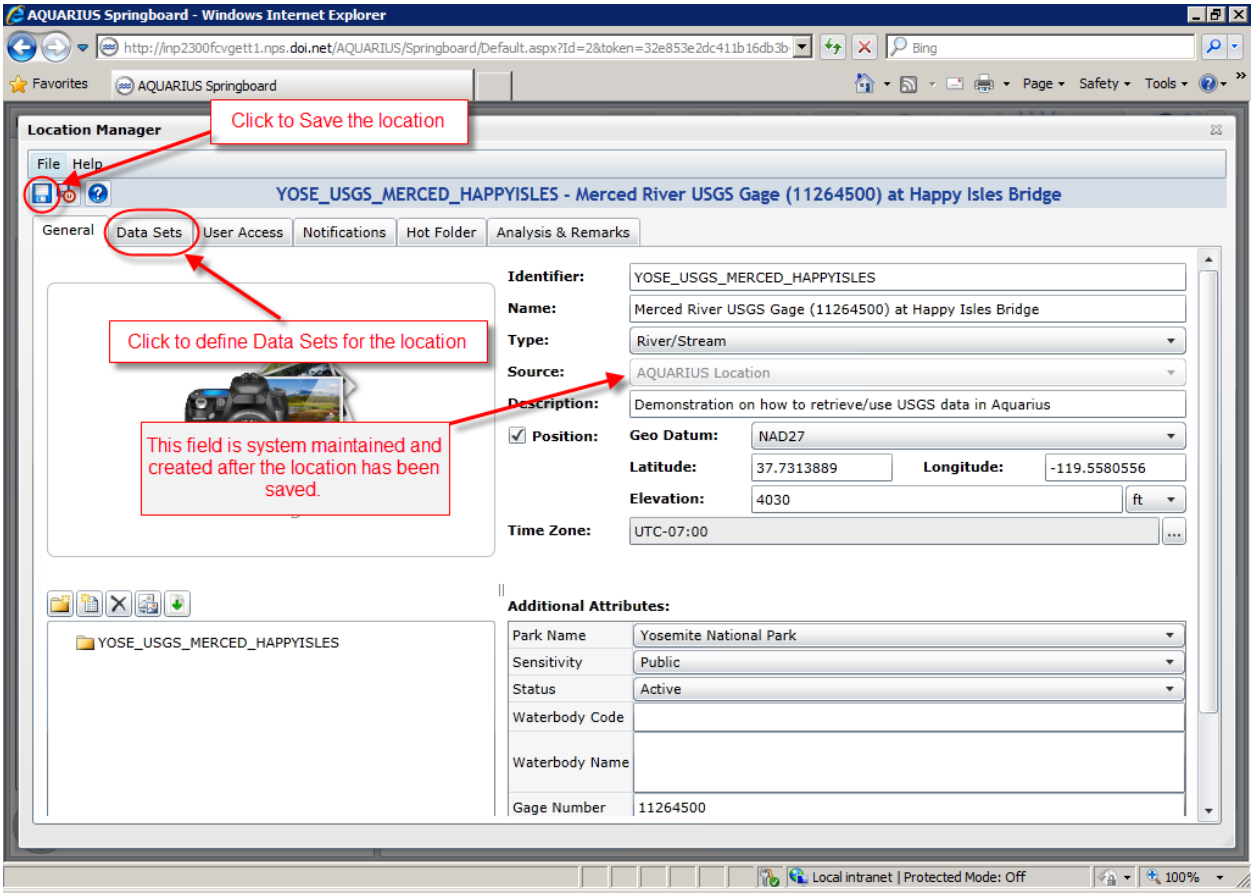
The next step is to create a location under the 'USGS Data' project to house the data. With the 'USGS Data' project selected (left-click it if it isn't currently selected), right-click the 'USGS Data' project and select 'New Location'. Alternatively, with the project selected, you could click the 'Location Manager' icon ( ) at the top of the screen. Aquarius will start the 'Location Manager' tool. The 'Location Manager' tool allows you to create and manage locations, data sets, user access, notifications, etc. Required fields are outlined in red.



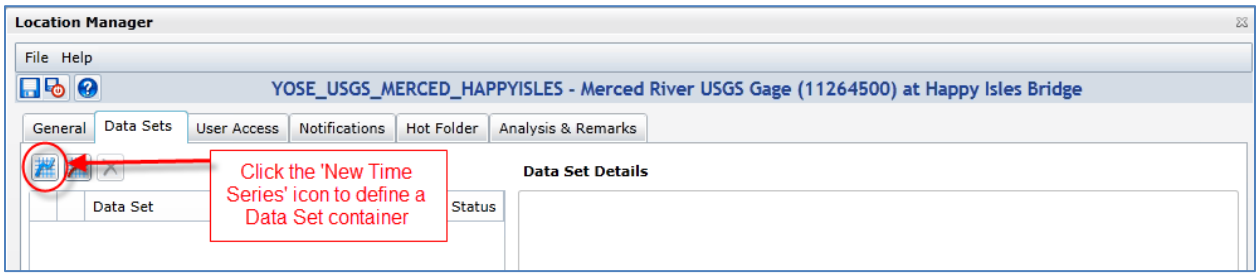
For the purpose of this overview, let's create an Aquarius location for the USGS stream gage on the Merced River at the Happy Isles Bridge in Yosemite National Park. The USGS' data and information about this stream gage can be found in the National Water Information System (NWIS) at:

http://waterdata.usgs.gov/nwis/nwisman/?site_no=11264500&agency_cd=USGS

Enter the required fields and other attributes as desired (and shown below) and then click 'File – Save' or the icon to save the location. Once the location has been saved/created, click the 'Data Sets' tab to define data set containers for the location.



Click the 'New Time Series' icon ( ) to create a Data Set container.

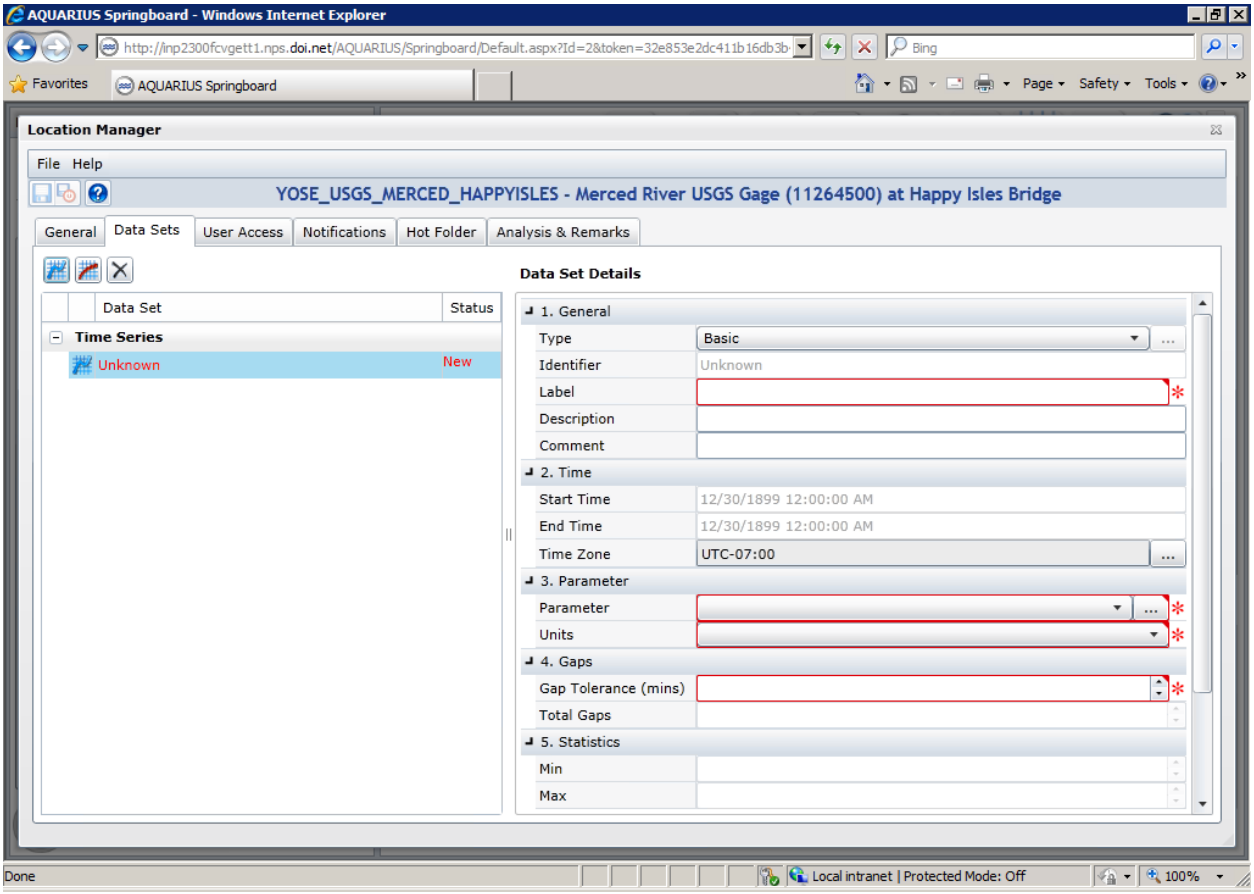


Aquarius stores time series data sets in parameter 'containers'. When storing data, you'll need to decide whether to store, for example, all the pH time series collected during multiple sonde deployments at a location in one pH data set container or whether to have separate pH data set containers for each sonde deployment or something in between (e.g. parameter by year, parameter by sonde, etc.). The advantage of one pH data set container is the organizational simplicity in archiving, analysis, and reporting of not having potentially hundreds of pH time series data set containers for a location. The disadvantage might be whether you really want to lump the deployment periods into one data set container, particularly if different sondes or

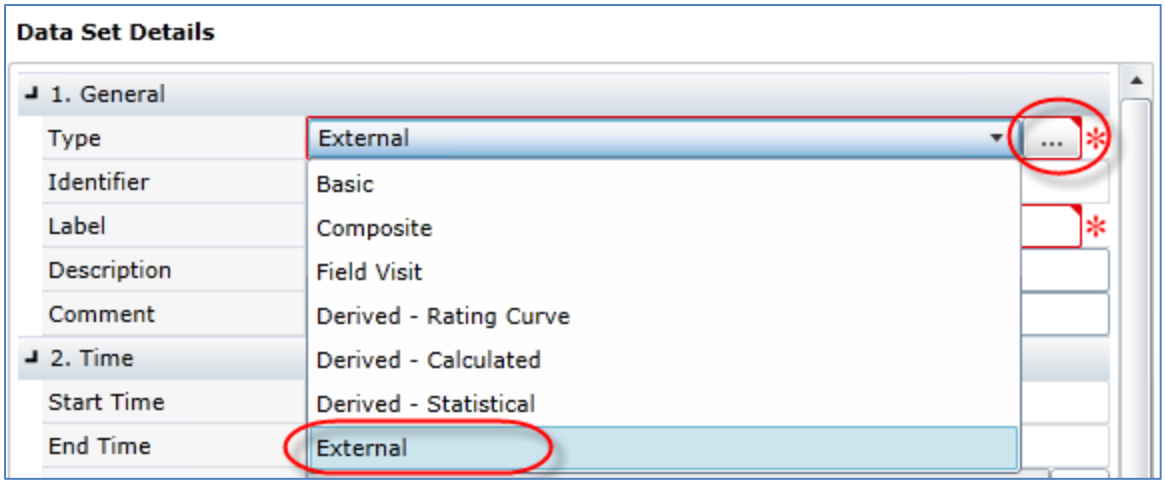
sensors were used over time. This disadvantage will likely disappear when Aquatic Informatics enables assigning instruments and sensors to each result. Until then, the only way to potentially distinguish multiple deployments in a pH container is via the Source attribute which will contain the import file name.

For this overview demonstration, we don't need to make this decision. The data we will access in NWIS are essentially single parameter data set containers housing all the data for a particular parameter over the entire period of record. Let's see how to use Aquarius' Open Geospatial Consortium (OGC) client capability to access data in NWIS.

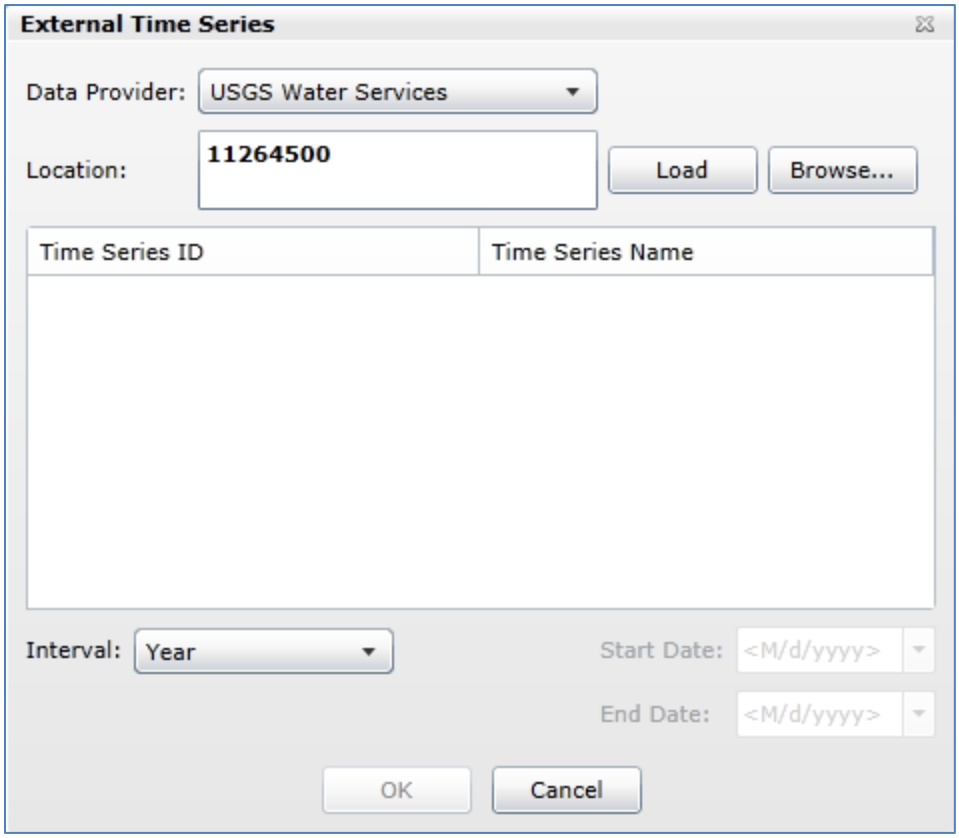
Fields required to define a data set container are outlined in red.



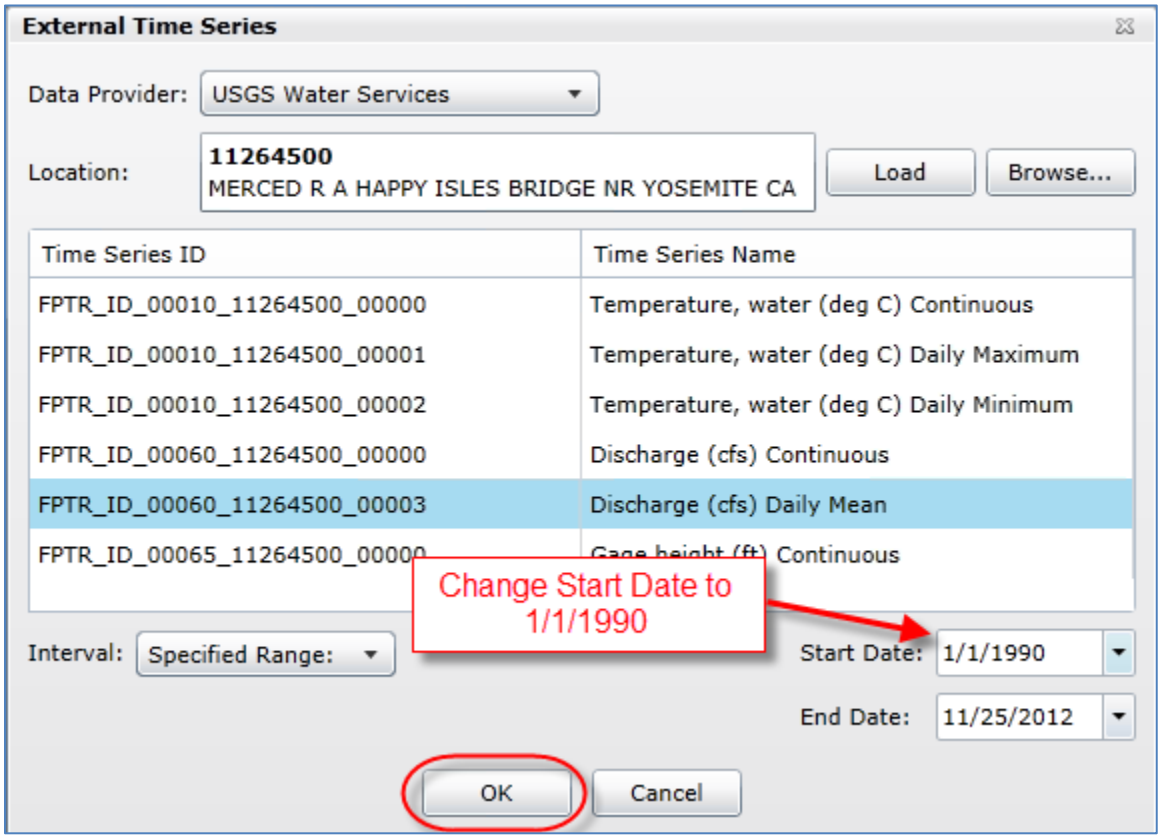
The first field that we'll need to alter in the 'Data Set Details' definition area is the 'Type' field. From the combo box drop-down, select 'External' to tell Aquarius that this data set is a data set that resides external to Aquarius.



Then click the ellipse icon () to the right of 'External' to configure the time series. Change the 'Data Provider' to be 'USGS Water Services'. The 'Browse' button enables you to pick a state and scroll through a list of USGS stations publishing data via web services in that state in order to select a location. Instead of doing that, simply type the USGS station ID (11264500) for Happy Isles in the 'Location' box and then click 'Load'.



A list of available time series data sets will appear. Select the 'Discharge (cfs) Daily Mean' time series. Note the Start (8/23/1915) and End Dates (11/25/2012). They show the start and end dates of the available data for the parameter at the location. Using the entire period of record, Aquarius would retrieve over 35,000 results. Although I have gotten that to work successfully, it can be sporadic due to Aquarius, internet connectivity, and web service issues. Consequently, rather than retrieving the entire period of record, change the Start Date to be '1/1/1990', leave the End Date set to today's date, and then click 'OK'.

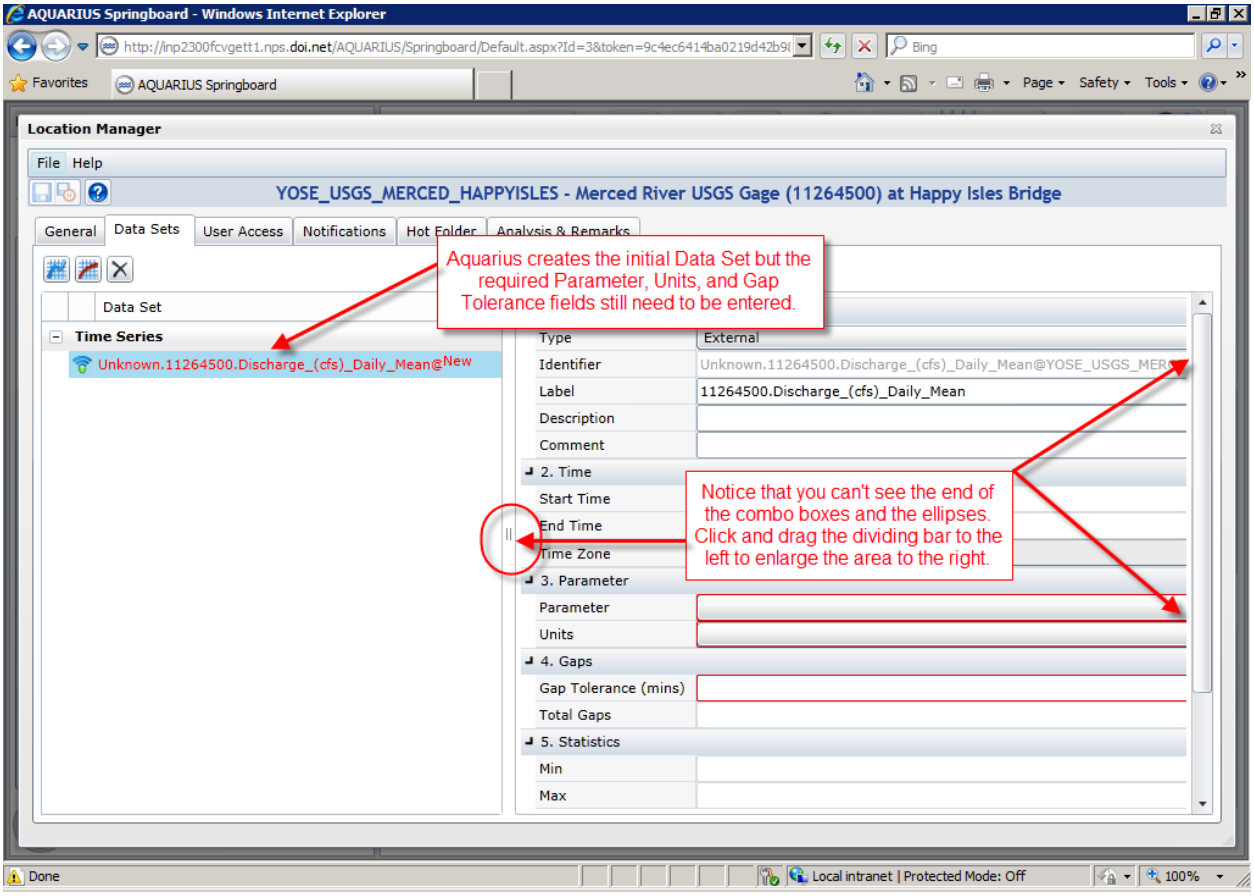


Aquarius 'validates' the time series. This may take a while depending on the quantity of data in the time series, the speed of your internet connection, and the status of the web services. There are over 8,350 daily means in this time series (from 1/1/1990 to 11/25/2012). When validation completes you'll be back at the 'Data Set Details' screen to complete the definition for this data set. Notice, however, that you can no longer see the combo boxes and ellipses (...*) to the right of the 'Data Set Details' fields. This is a glitch in this release of Aquarius[1]. You'll need to click and drag to the left the bar that divides the 'Time Series' area from the 'Data

[1] According to Aquatic Informatics, the functionality to access external data sources in Aquarius v.3.0 Release 5 is considered 'beta'. This means that it hasn't been completely tested and there may be some issues. I've reported a number of issues with this functionality to Aquatic Informatics. For example, the other time series at this location don't appear to return data to Aquarius. Additionally, there are a lot of enhancements that could be made to how Aquarius retrieves and uses the external USGS data.

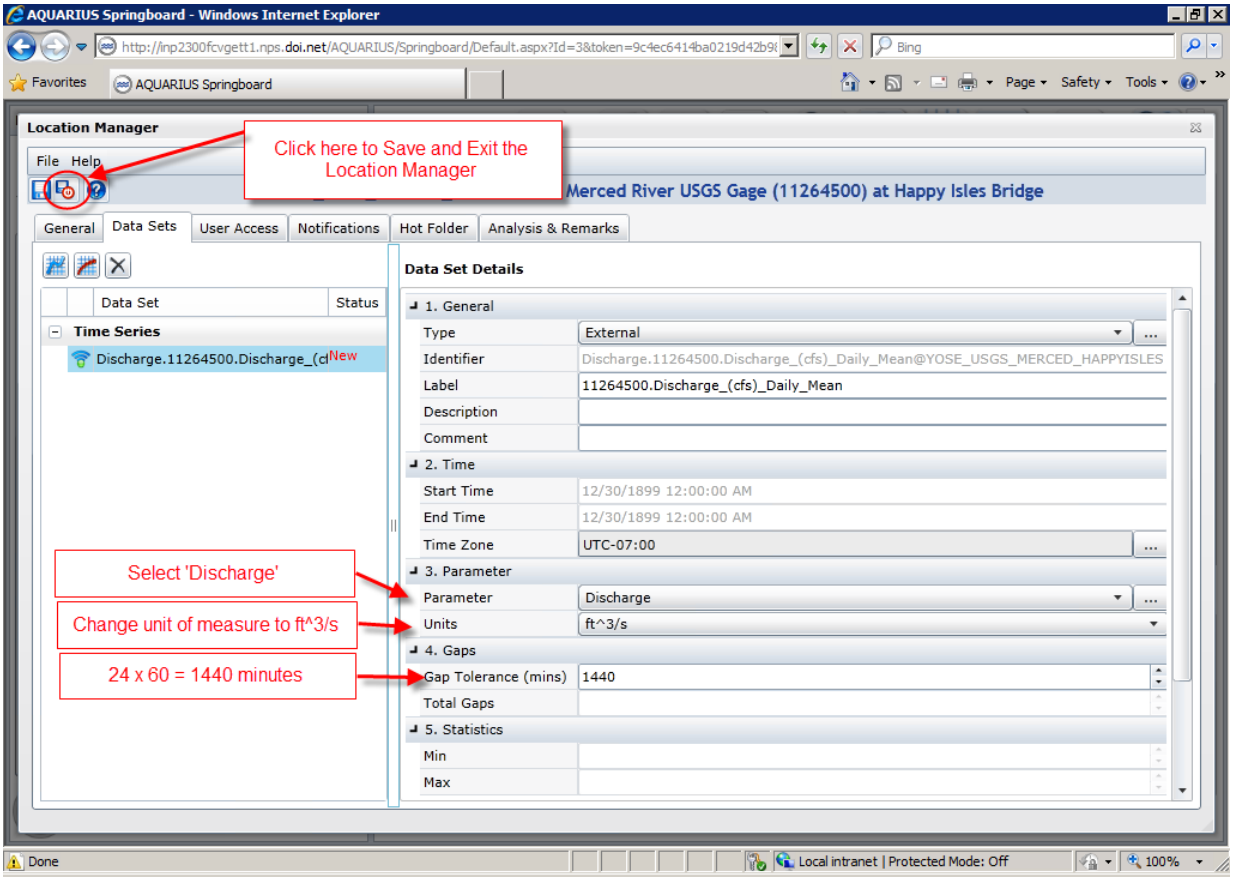
Set Details' area to enlarge the 'Data Set Details'. That should enable you to see the combo boxes and ellipses () again.

Note: The setting for 'End Date' determines the chunk of data retrieved. If a month later you want to access this data, that chunk will still be there but you won't get the newer month of data unless you modify the 'End Date' to include it.

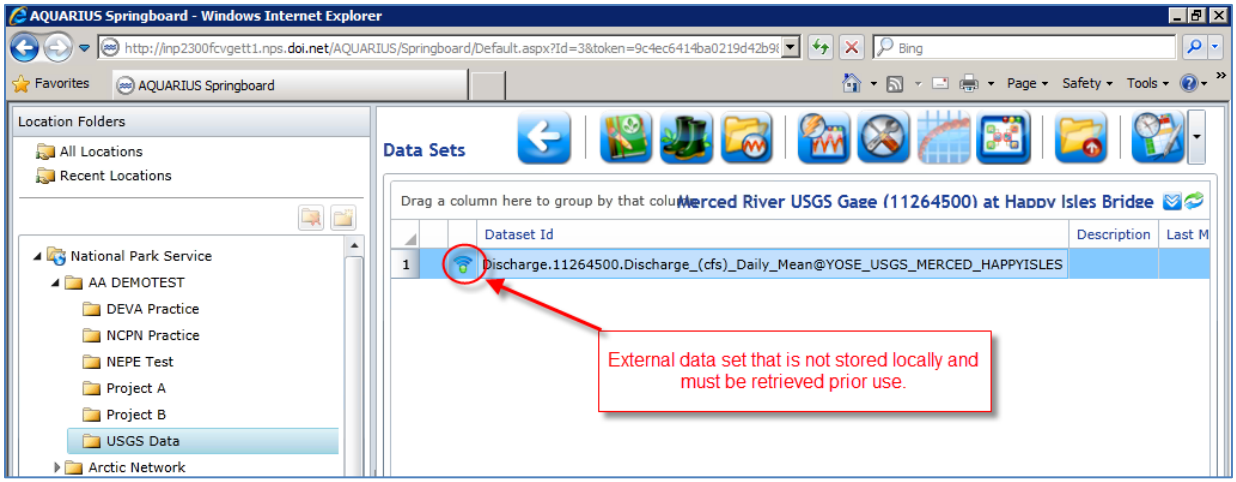


Use the combo box drop-down or ellipse for Parameter and select 'Discharge'. Use the combo-box drop-down for units to select 'ft^3/s'. Since these are daily means, enter '1440' minutes (24 x 60 = 1440) for 'Gap Tolerance (mins)'.

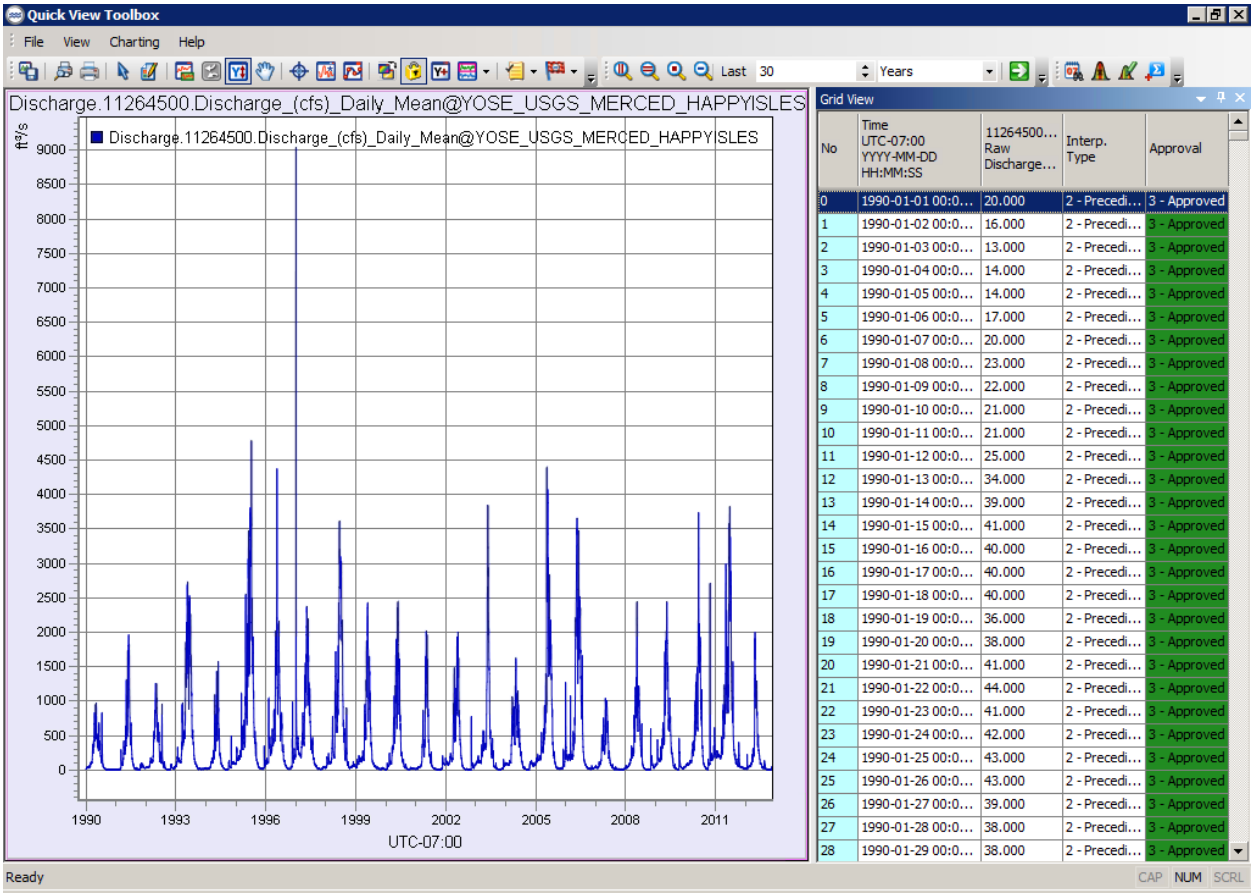
When you are done defining this data set, click the 'Save & Exit' button () or 'File – Save & Exit' to return to Springboard. Notice that you can also click the 'Save' button () or 'File – Save' to save your entry at any time and continue working in the 'Location Manager'.



Back in Springboard, notice the icon next to the new data set. This indicates that it is an external data set. For external data sets, the data never reside in Aquarius. Only the connection information is stored. The data are always retrieved upon demand. This synchronization is great for ensuring you always work with a current version of the data but may result in slower performance. Note: if additional (more recent) data are available from the data source, you'll need to edit the 'End Date' for this data set for those data to be included.



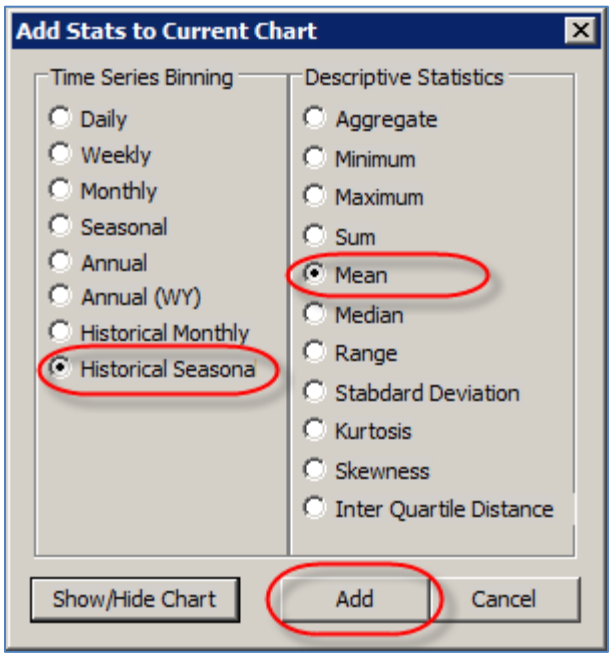
Left-click on the external data set container to select it; then either right-click it and select 'Quick View' or left-click on the 'Quick View' icon ( ). A message at the bottom of the screen will say 'Finished launching QuickViewApp.Document successful.' but it may take a minute before the 'Quick View' tool downloads the data from the USGS NWIS server and displays it. Aquarius will show you a graphical depiction of the data on the left and a table (grid) view of the data on the right. Depending on your last settings for using the 'Quick View' tool, you may need to click the icon to reset the graph' axes to show the entire period of record as shown below.



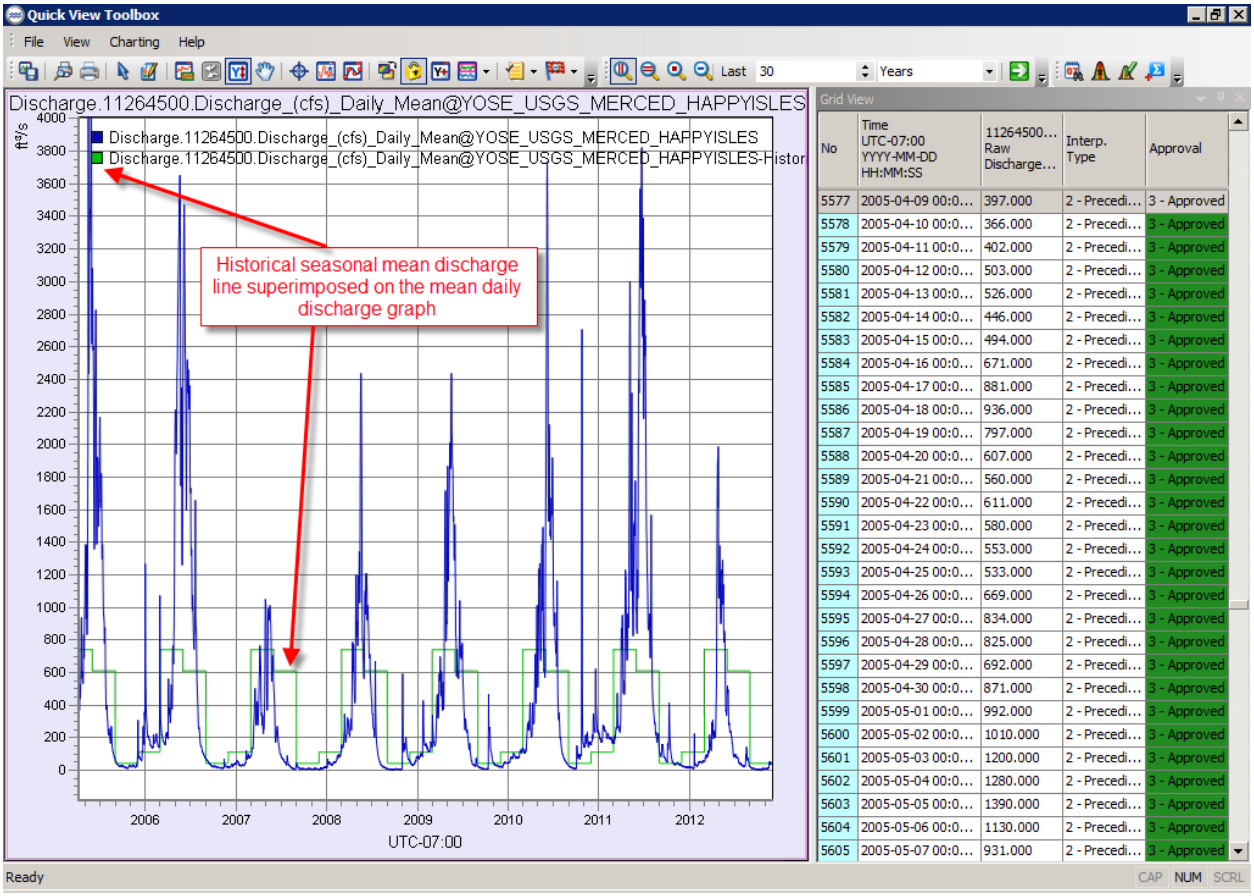
While the data for an external data set are not stored in Aquarius, the attributes that don't come from the source (flags, notes, grades, etc.) and can be assigned in the 'Data Correction' toolbox are stored locally in Aquarius.

That concludes the demonstration of the first new feature: OGC/web client access to external data sources (how to use USGS data). While still in 'Quick View', let's take a look at the second new feature: Summary Data Graphed in 'Quick View'. Click the icon at the far right of the 'Quick View' toolbox icon row in the upper right. This icon will pop up a small form allowing you to select what summary data (statistics) to add to the graph in 'Quick View'. You first select how you want

the time series data binned (grouped) and then choose the descriptive statistic to calculate for each bin/group. Go ahead and select 'Historical Seasonal' and 'Mean' and then click 'Add'.



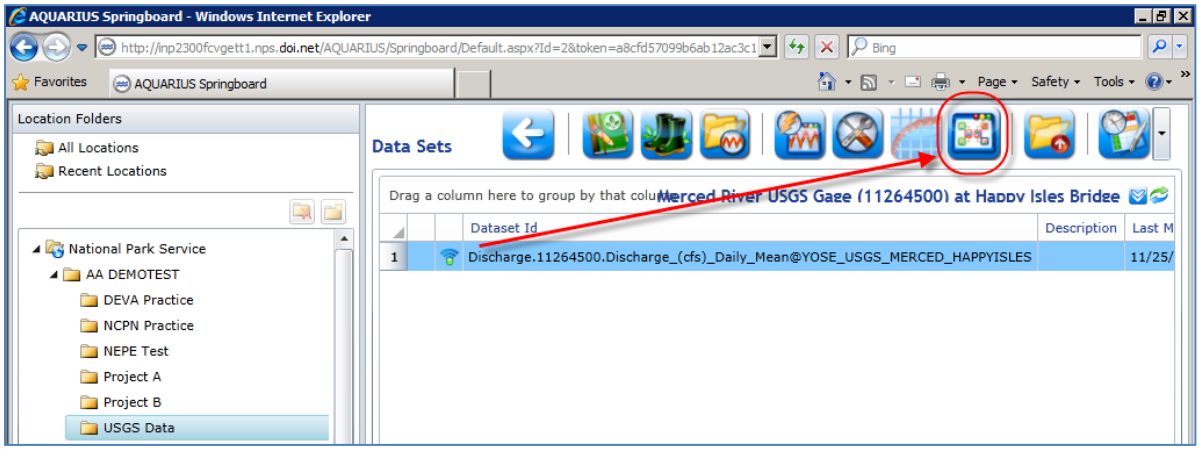
Aquarius will add a new line to the 'Quick View' graph that displays the historical seasonal mean discharge. You'll need to use the icon to zoom into a section of the graph in order to see the green line that was added for historical seasonal mean discharge. You'll notice two things about the historical seasonal mean discharge curve. The seasonal mean pattern is the same for every year because this is 'Historical Seasonal' and the seasonal bins are: (1) December through February; (2) March through May; (3) June through August; and (4) September through November.



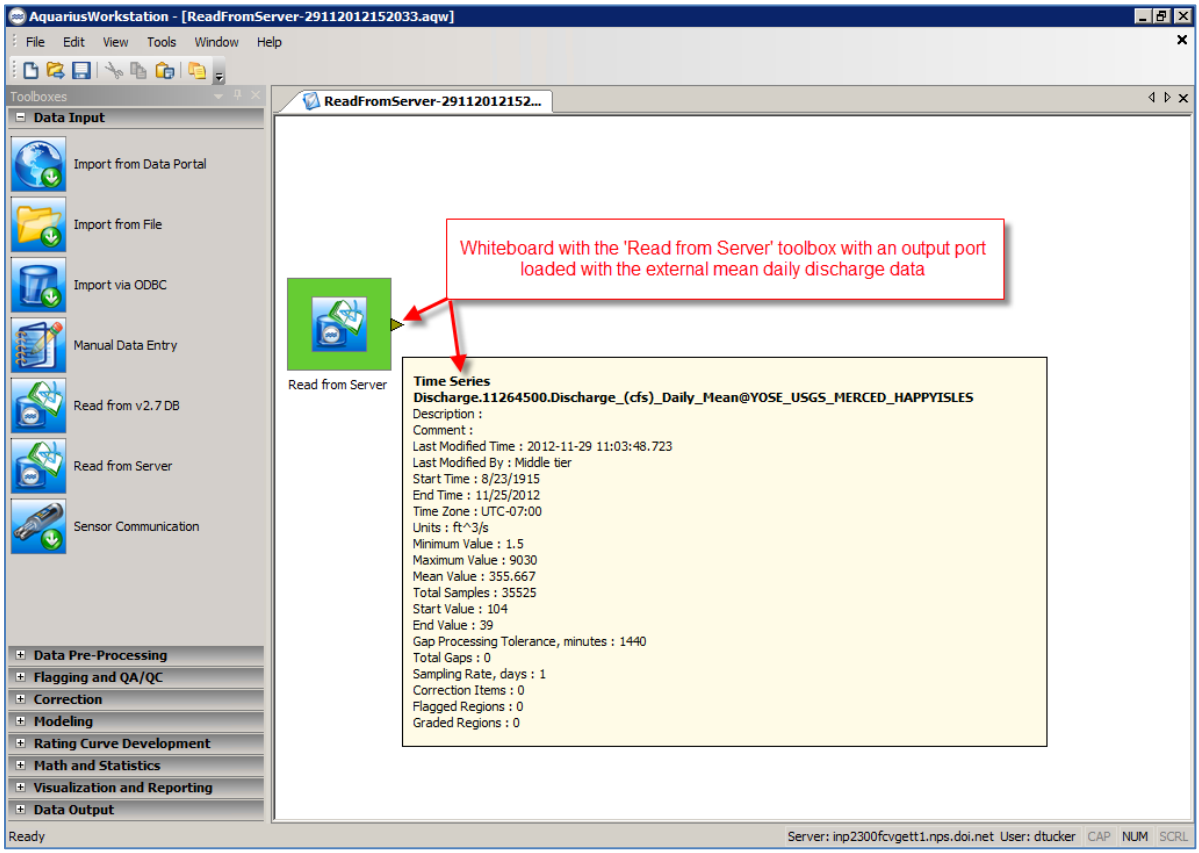
No	Time UTC-07:00 YYYY-MM-DD HH:MM:SS	11264500... Raw Discharge...	Interp. Type	Approval
5577	2005-04-09 00:0...	397.000	2 - Precedi...	3 - Approved
5578	2005-04-10 00:0...	366.000	2 - Precedi...	3 - Approved
5579	2005-04-11 00:0...	402.000	2 - Precedi...	3 - Approved
5580	2005-04-12 00:0...	503.000	2 - Precedi...	3 - Approved
5581	2005-04-13 00:0...	526.000	2 - Precedi...	3 - Approved
5582	2005-04-14 00:0...	446.000	2 - Precedi...	3 - Approved
5583	2005-04-15 00:0...	494.000	2 - Precedi...	3 - Approved
5584	2005-04-16 00:0...	671.000	2 - Precedi...	3 - Approved
5585	2005-04-17 00:0...	881.000	2 - Precedi...	3 - Approved
5586	2005-04-18 00:0...	936.000	2 - Precedi...	3 - Approved
5587	2005-04-19 00:0...	797.000	2 - Precedi...	3 - Approved
5588	2005-04-20 00:0...	607.000	2 - Precedi...	3 - Approved
5589	2005-04-21 00:0...	560.000	2 - Precedi...	3 - Approved
5590	2005-04-22 00:0...	611.000	2 - Precedi...	3 - Approved
5591	2005-04-23 00:0...	580.000	2 - Precedi...	3 - Approved
5592	2005-04-24 00:0...	553.000	2 - Precedi...	3 - Approved
5593	2005-04-25 00:0...	533.000	2 - Precedi...	3 - Approved
5594	2005-04-26 00:0...	669.000	2 - Precedi...	3 - Approved
5595	2005-04-27 00:0...	834.000	2 - Precedi...	3 - Approved
5596	2005-04-28 00:0...	825.000	2 - Precedi...	3 - Approved
5597	2005-04-29 00:0...	692.000	2 - Precedi...	3 - Approved
5598	2005-04-30 00:0...	871.000	2 - Precedi...	3 - Approved
5599	2005-05-01 00:0...	992.000	2 - Precedi...	3 - Approved
5600	2005-05-02 00:0...	1010.000	2 - Precedi...	3 - Approved
5601	2005-05-03 00:0...	1200.000	2 - Precedi...	3 - Approved
5602	2005-05-04 00:0...	1280.000	2 - Precedi...	3 - Approved
5603	2005-05-05 00:0...	1390.000	2 - Precedi...	3 - Approved
5604	2005-05-06 00:0...	1130.000	2 - Precedi...	3 - Approved
5605	2005-05-07 00:0...	931.000	2 - Precedi...	3 - Approved

That concludes the demonstration of the second new feature: Summary Data Graphed in 'Quick View'. Go ahead and close 'Quick View' by either clicking the ☒ icon in the upper right corner or clicking 'File – Exit'. You will be returned to Springboard.

Let's take a look at the third new feature: Launch Aquarius Whiteboard from Within Springboard. This feature makes it easier to quickly move data from Springboard into the Workstation/Whiteboard environment so you can make use of the toolboxes that only exist in Whiteboard. With the external mean daily discharge data set selected, click on the Whiteboard icon ( ) to send the external mean daily discharge data set to the Whiteboard.

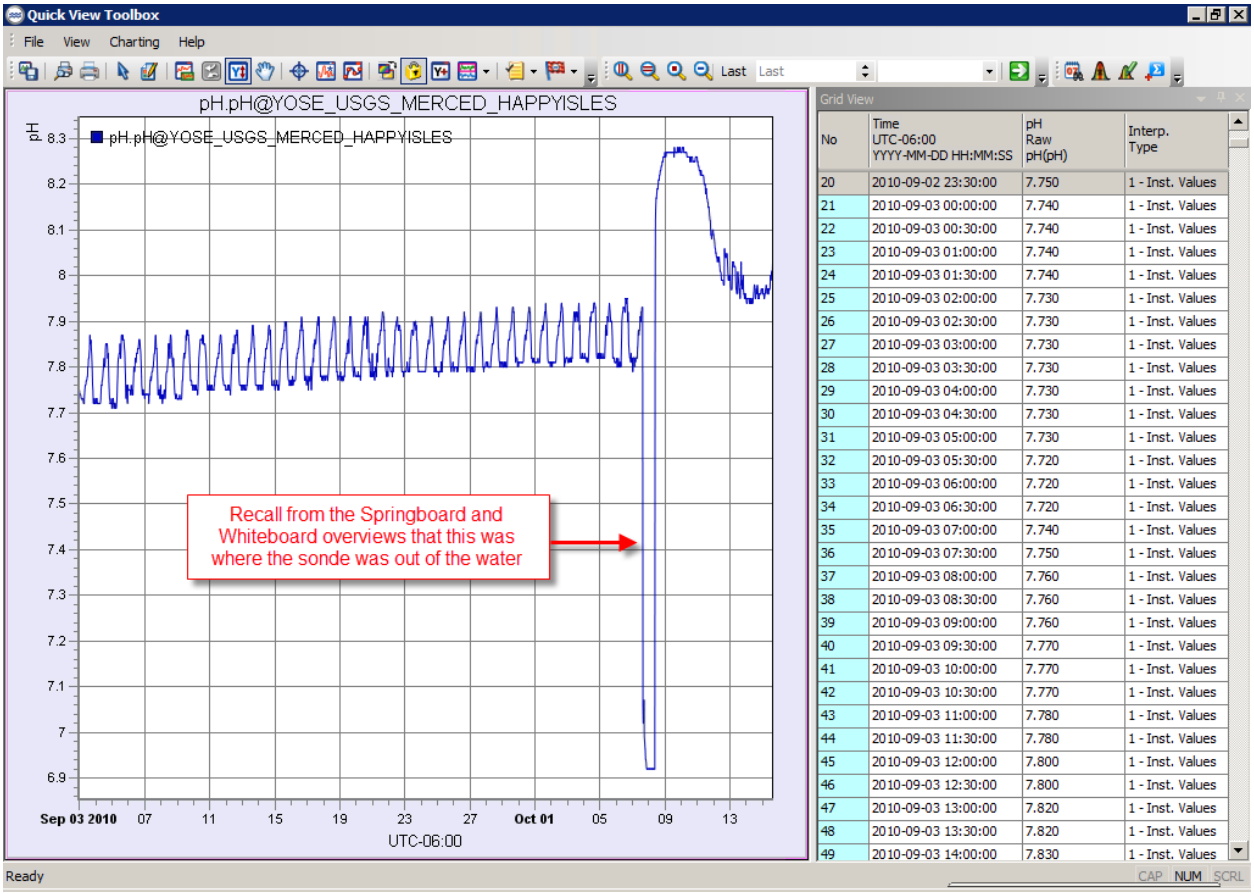


Now the time series can be processed with other toolboxes in the Whiteboard environment.



That concludes the demonstration of the third new feature: Launch Aquarius Whiteboard from Within Springboard. Go ahead and close the Aquarius Workstation/Whiteboard by either clicking the icon in the upper right corner or clicking 'File – Exit'. Click 'No' when it prompts you to save changes. You will be returned to Springboard.

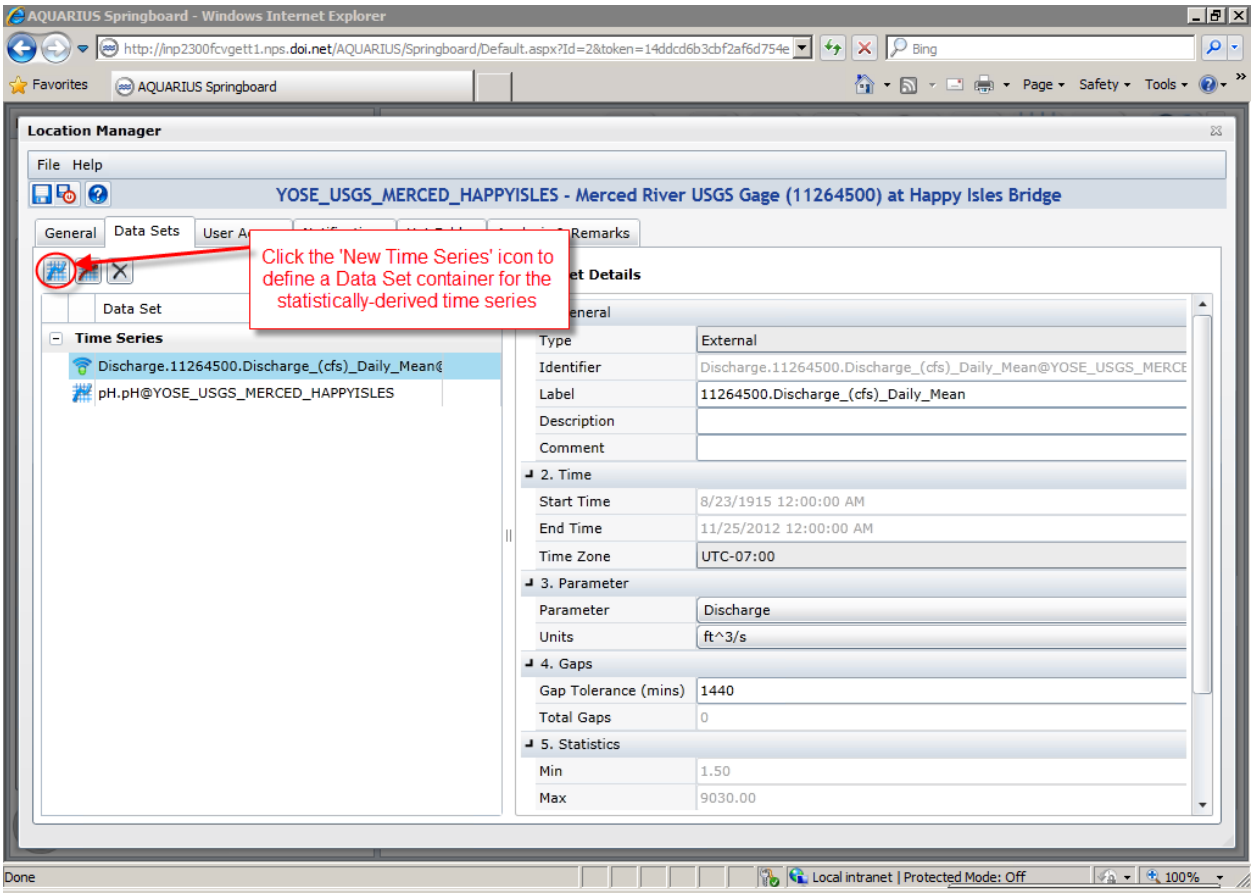
The fourth new feature to demonstrate is: Statistically-Derived Time Series. This feature allows you to automatically create one time series from another. An obvious application of this would be to statistically derive a mean daily discharge time series from a 15-minute discharge time series. Ideally we would continue to work with our external mean daily discharge time series and use the statistically-derived time series functionality to compute, perhaps, mean weekly discharge. Unfortunately, this functionality does not appear to work with external data sources at this time so to demonstrate statistically-derived time series, I'll use the pH data from Rocky Mountain National Park that were imported during the Springboard and Whiteboard overviews. I've now imported this pH data into this Happy Isles location. The data appear as below.



No	Time UTC-06:00 YYYY-MM-DD HH:MM:SS	pH Raw pH(pH)	Interp. Type
20	2010-09-02 23:30:00	7.750	1 - Inst. Values
21	2010-09-03 00:00:00	7.740	1 - Inst. Values
22	2010-09-03 00:30:00	7.740	1 - Inst. Values
23	2010-09-03 01:00:00	7.740	1 - Inst. Values
24	2010-09-03 01:30:00	7.740	1 - Inst. Values
25	2010-09-03 02:00:00	7.730	1 - Inst. Values
26	2010-09-03 02:30:00	7.730	1 - Inst. Values
27	2010-09-03 03:00:00	7.730	1 - Inst. Values
28	2010-09-03 03:30:00	7.730	1 - Inst. Values
29	2010-09-03 04:00:00	7.730	1 - Inst. Values
30	2010-09-03 04:30:00	7.730	1 - Inst. Values
31	2010-09-03 05:00:00	7.730	1 - Inst. Values
32	2010-09-03 05:30:00	7.720	1 - Inst. Values
33	2010-09-03 06:00:00	7.720	1 - Inst. Values
34	2010-09-03 06:30:00	7.720	1 - Inst. Values
35	2010-09-03 07:00:00	7.740	1 - Inst. Values
36	2010-09-03 07:30:00	7.750	1 - Inst. Values
37	2010-09-03 08:00:00	7.760	1 - Inst. Values
38	2010-09-03 08:30:00	7.760	1 - Inst. Values
39	2010-09-03 09:00:00	7.760	1 - Inst. Values
40	2010-09-03 09:30:00	7.770	1 - Inst. Values
41	2010-09-03 10:00:00	7.770	1 - Inst. Values
42	2010-09-03 10:30:00	7.770	1 - Inst. Values
43	2010-09-03 11:00:00	7.780	1 - Inst. Values
44	2010-09-03 11:30:00	7.780	1 - Inst. Values
45	2010-09-03 12:00:00	7.800	1 - Inst. Values
46	2010-09-03 12:30:00	7.800	1 - Inst. Values
47	2010-09-03 13:00:00	7.820	1 - Inst. Values
48	2010-09-03 13:30:00	7.820	1 - Inst. Values
49	2010-09-03 14:00:00	7.830	1 - Inst. Values

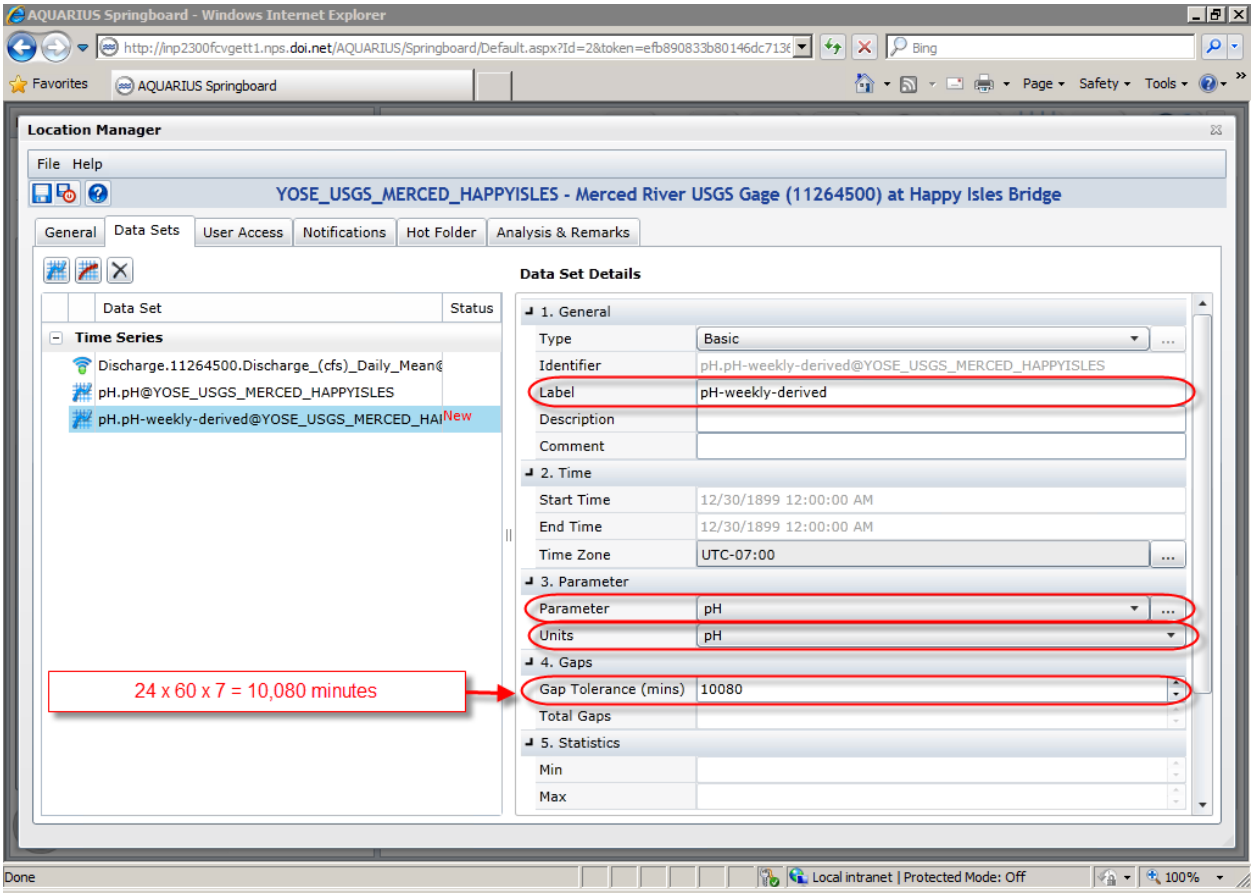
To statistically-derive a weekly time series from these data, close the 'Quick View' tool (if open). With the Happy Isles location selected (highlighted in cyan), left-click the 'Location Manager'

icon ( ) at the top of the screen or right-click the location and choose ‘Location Manager’. Aquarius will start the ‘Location Manager’ tool. Click the ‘Data Sets’ tab. You should see the external discharge data set and the pH data set that I just imported.

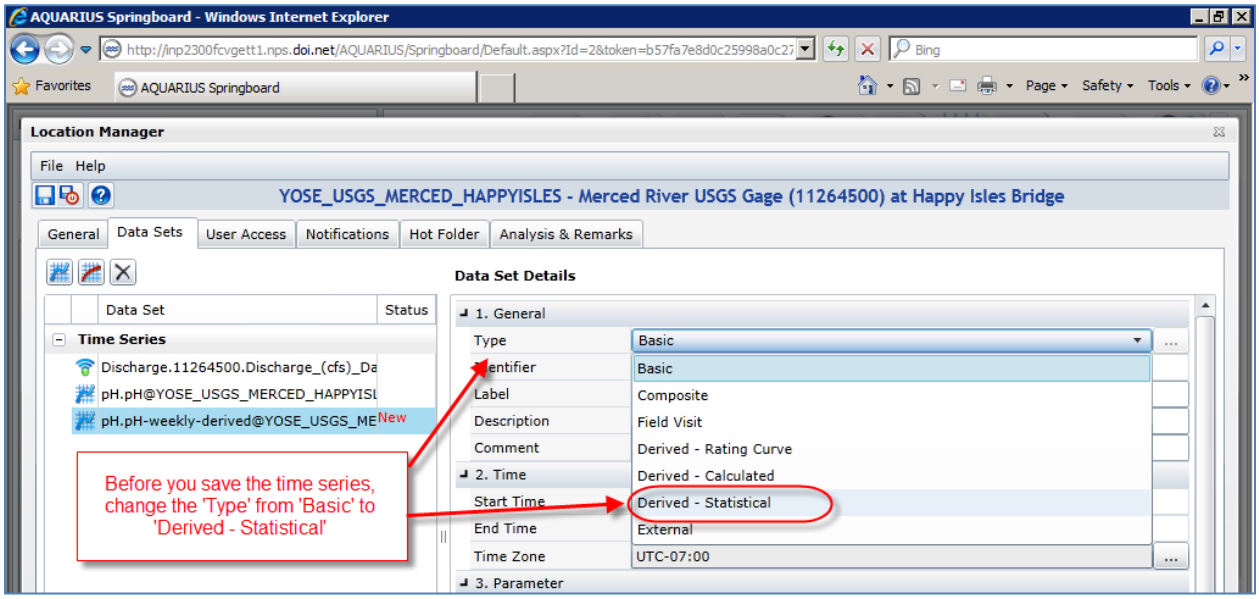


Click the ‘New Time Series’ icon ( ) to create a Data Set container for the statistically-derived time series. Enter the following data set details:

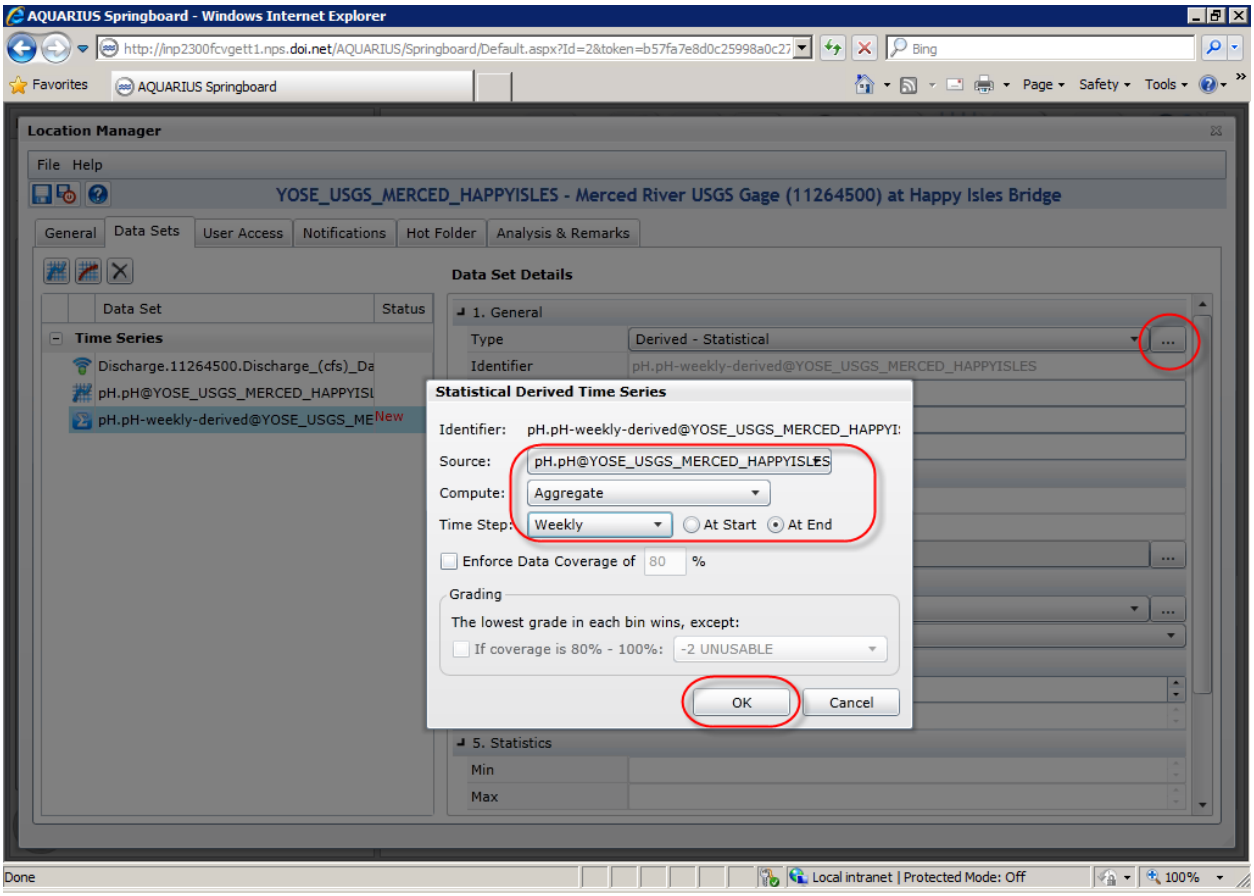
Label: ‘pH-weekly-derived’
Parameter: pH
Units: pH
Gap Tolerance (mins): 10080



Before you save the time series, change the 'Type' from 'Basic' to 'Derived – Statistical'.

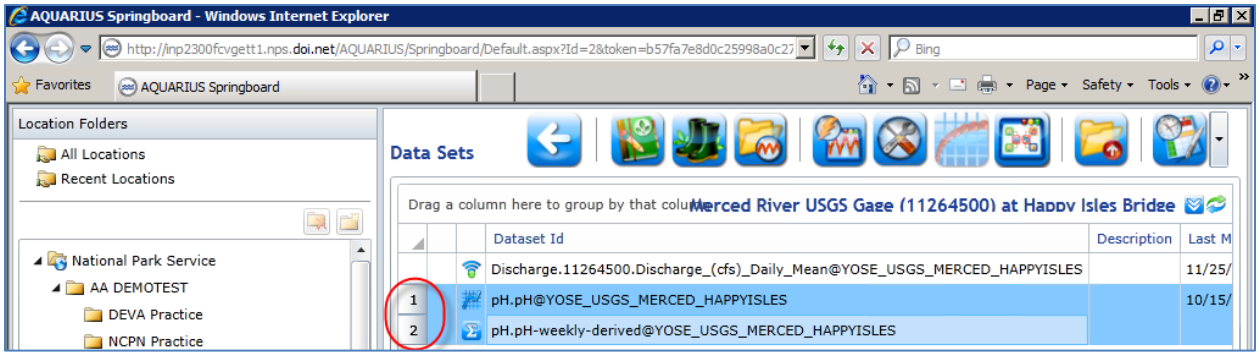


Then click the ellipse icon ( ) to the right of 'Derived - Statistical' to configure the statistically-derived time series. Change the 'Source' to be the 15-minute pH time series, set 'Compute' to 'Aggregate' and 'Time Step' to 'Weekly' and then click 'OK'.

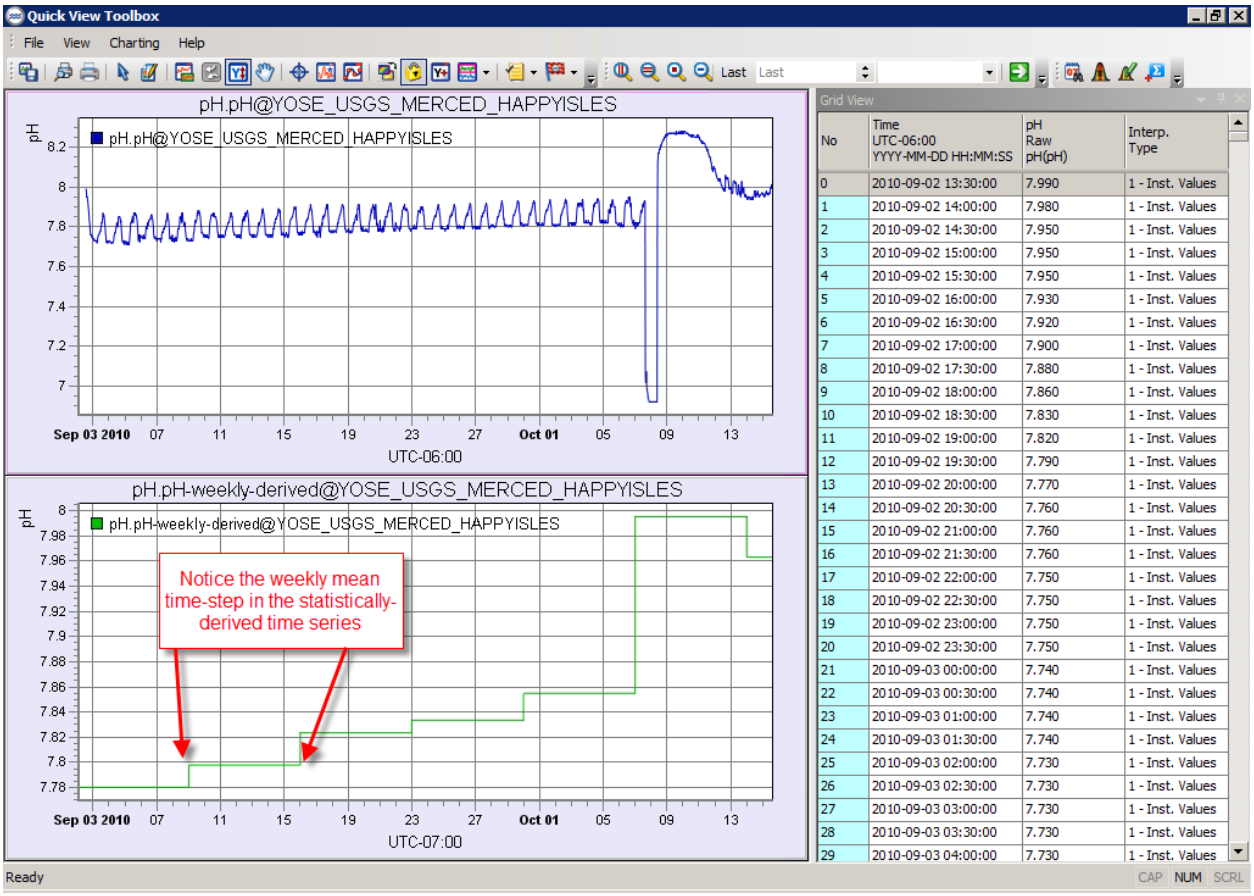


When you are done configuring this statistically-derived data set, click the 'Save & Exit' button ( ) or 'File – Save & Exit' to return to Springboard. Notice the icon to the left of the 'pH-weekly-derived' time series. This indicates that it is a statistically-derived time series. The power of statistically-derived time series becomes evident when you add new data to the parent 'pH' time series. The child statistically-derived time series will be automatically updated to reflect changes in the parent 'pH' time series.

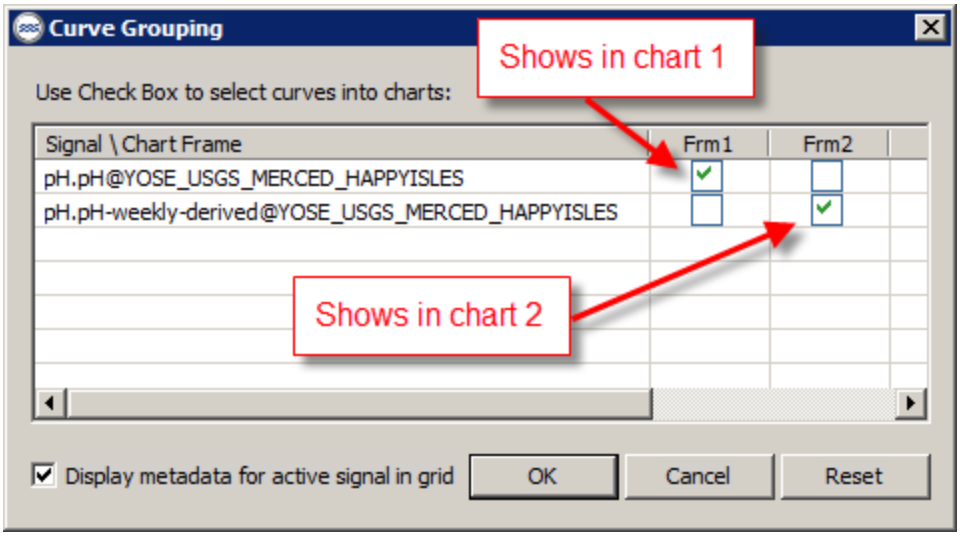
To see the new statistically-derived 'pH-weekly-derived' time series in the 'Quick View' tool, select both it and the parent 'pH' time series so there is a number 1 and 2 next to both of the data sets.



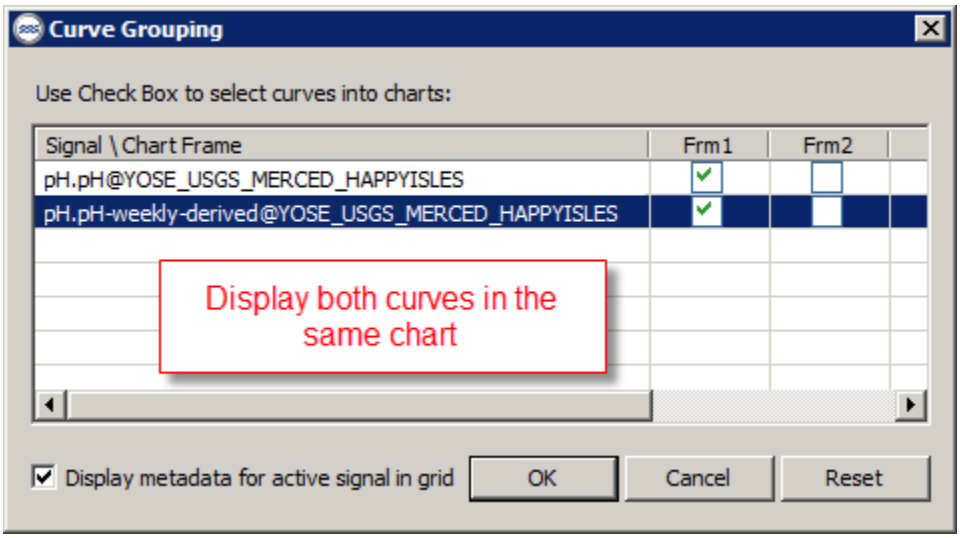
Then, either right-click the selected data sets or left-click on the 'Quick View' icon ( ). Aquarius will draw both graphs. The statistically-derived time series has the diagnostic stair-step – in this case a weekly stair-step.



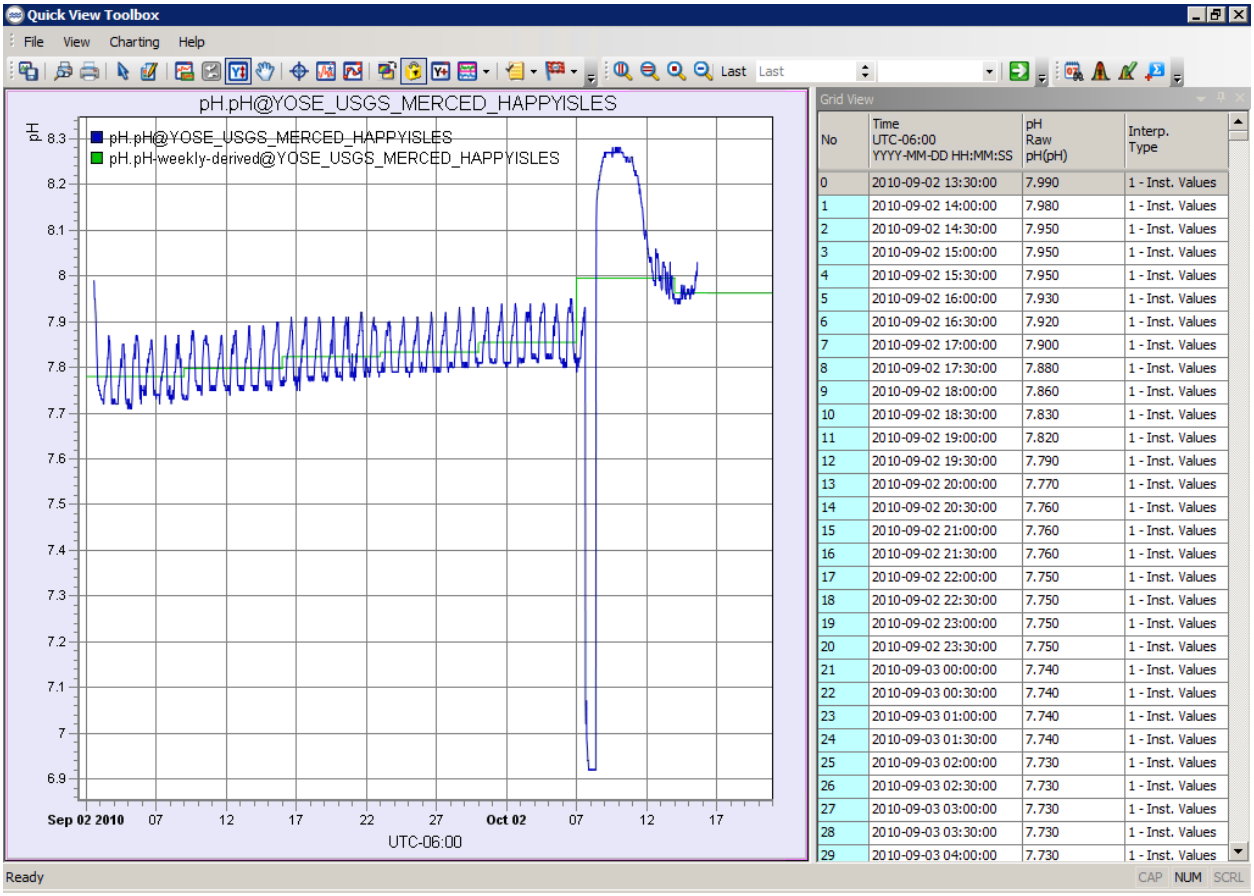
You can click on the 'Multiple Curves in Chart Frame' icon ( ) located in the icon bar to control which curves are displayed on which chart. For the above, the 'Multiple Curves in Chart Frame' is set to:



Changing those options to:



yields:

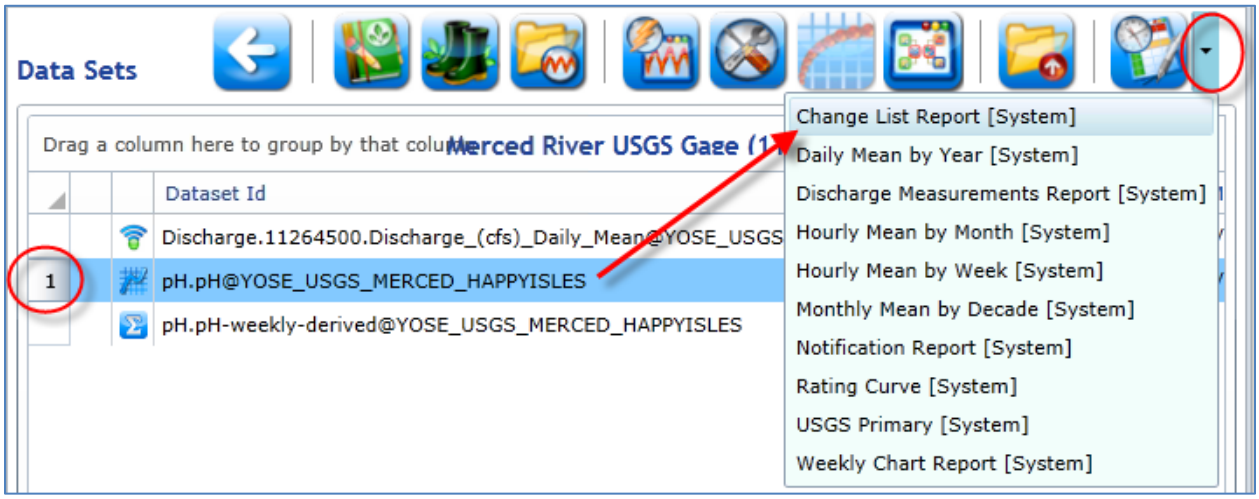


From a graphical standpoint, the statistically-derived time series is the same as clicking the icon at the far right of the 'Quick View' toolbox icon row in the upper right (as demonstrated above for the 2nd new feature) and selecting 'Weekly' and 'Mean'. The major differences are that the statistically-derived time series stays synchronized with its parent time series and is an actual time series while the summary data graphed in 'Quick View' is just a curve superimposed on the chart.

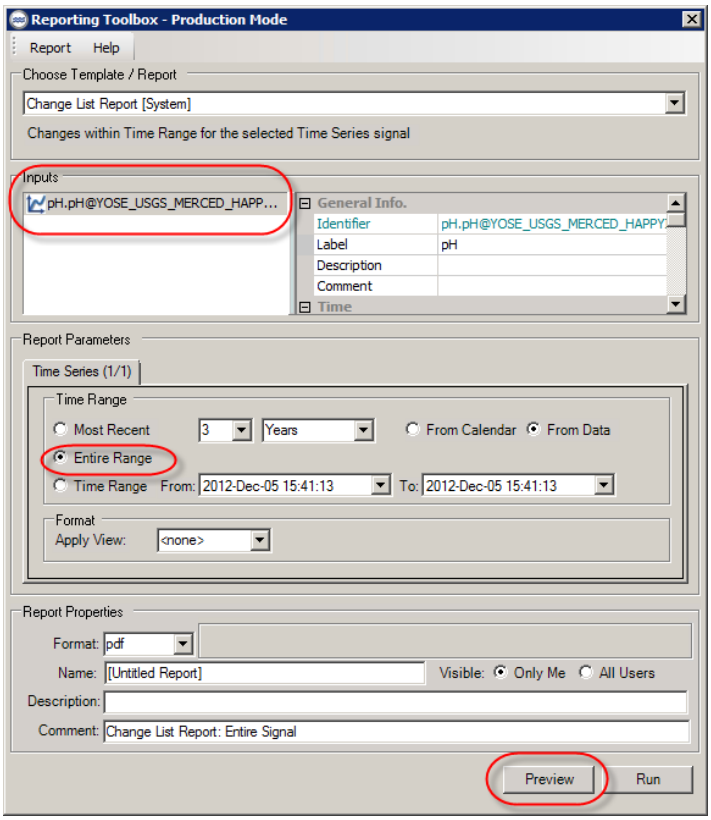
That concludes the demonstration of the fourth new feature: Statistically-Derived Time Series. Go ahead and close 'Quick View' by either clicking the icon in the upper right corner or clicking 'File – Exit'. You will be returned to Springboard.

The fifth and last new feature to demonstrate is: Reporting Enhancements. To demonstrate this, I've made some 'Data Correction' toolbox edits to the pH time series. Specifically, as with the Springboard and Whiteboard tutorials, I processed a delete region change to remove data points 1684 (2010-10-07 15:30:00) through 2067 (2010-10-07 23:30:00), inclusive, where the sonde was out of water but still collecting data. I also set all the data through 2010-10-07 15:00:00 as 'Approved' and graded it as excellent. Let's see how Aquarius can now report on these changes.

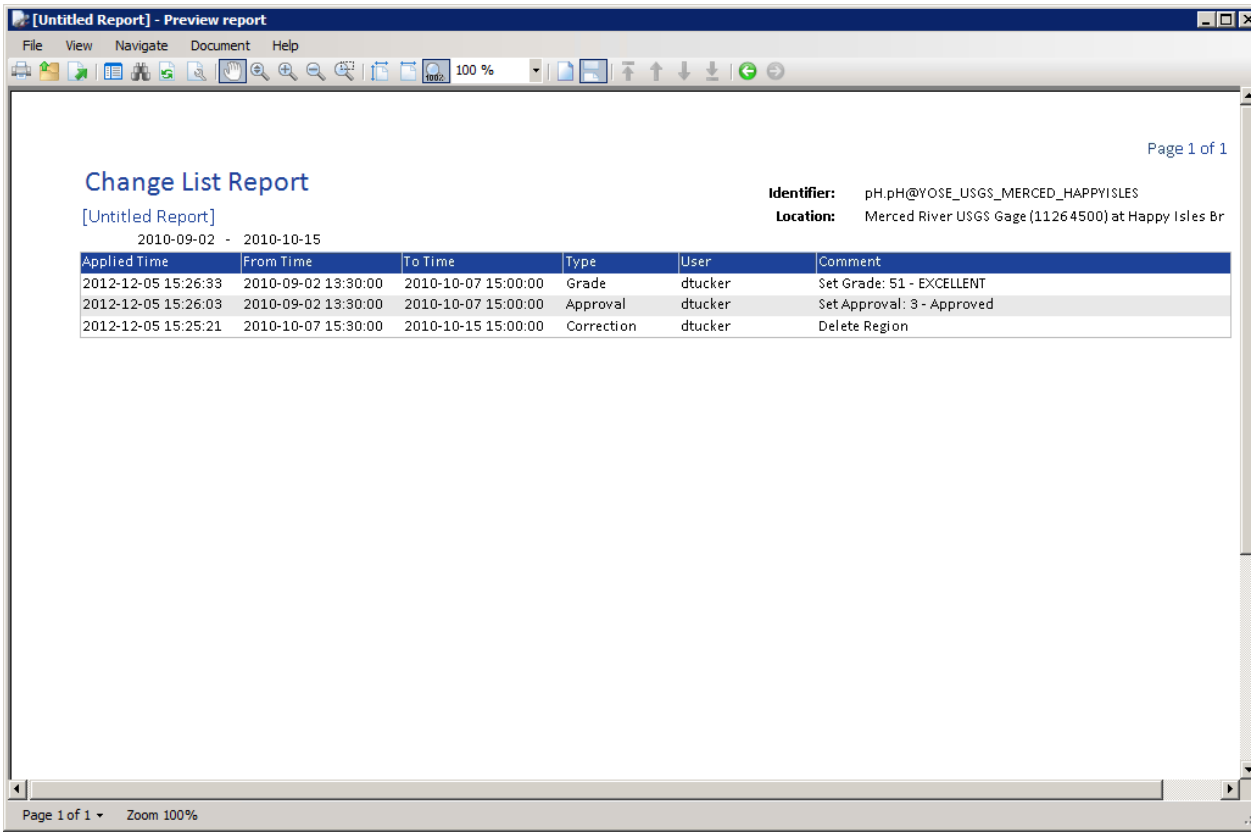
Under ‘Data Sets’, select the ‘pH.pH@YOSE_USGS_MERCED_HAPPYISLES’ data set so it has a ‘1’ in the first column. Then select the drop-down arrow next to the Reports icon ( ) and select ‘Change List Report [System]’.



If the ‘Reporting’ toolbox doesn’t pop-up, look for it on the Task Bar and click it. The selected time series appears in the ‘Inputs’ area. Under ‘Time Range’, select ‘Entire Range’ and then click ‘Preview’ at the bottom.



Aquarius generates a report listing the edits that I described making above in the 'Data Correction' toolbox.



That concludes this overview of a subset of the new features in Aquarius v.3.0 Release 5. To view an Aquatic Informatics' video of all the new features in Release 5 as demonstrated by the Aquarius Product Manager at the 2012 User Group meeting, click on the link below.

http://support.aquaticinformatics.com/AQVideos/AQUARIUS-Insider-2012/AQUARIUS-Insider-2102-Part2/AQUARIUS-Insider-2102-Part2.html

Aquarius is a sophisticated system with many capabilities beyond what was briefly demonstrated here. Consult the on-line help and the additional resources below for more information on how to harness these capabilities for your park or network.

Important Note:

When you complete your Aquarius session by exiting Whiteboard (or closing the Springboard web page), be sure to also right-click on the Aquarius Assistant icon in the Task Bar and choose 'Exit' to free up the license you were using sooner for other would-be users.

Additional Resources:

The Aquatic Informatics support portal at http://aquaticinformatics.com/main/%3FSupport_Login provides a lot of 'How To' videos for both Whiteboard and Springboard. To log into the Aquarius 360 support portal, you'll need a username and password which can be obtained via an email request to support@aquaticinformatics.com.